ROYSON

BULLETIN 231

LECTROCOUNT II

LECTROCOUNT II

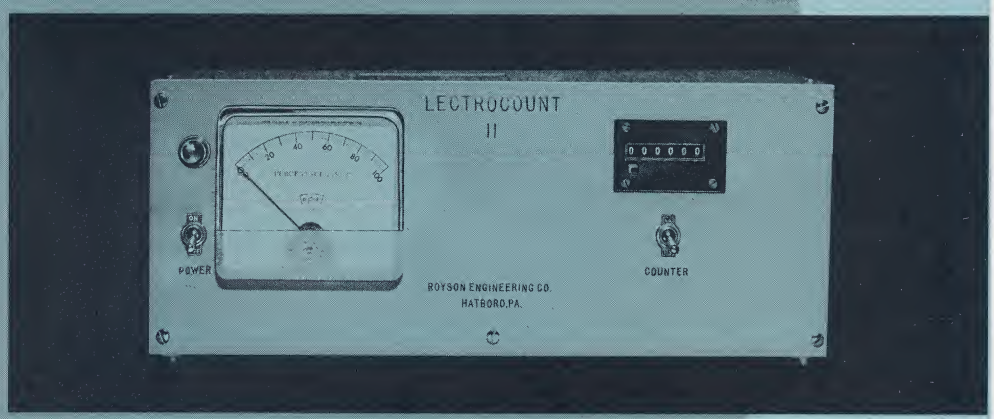
Electronic Integrator

for: CHROMATOGRAPHY

DENSITOMETRY

TOTALIZING KILOWATT and AMPERE HOURS

and as an ANALOG to DIGITAL CONVERTER



ADVANTAGES:

- Chopper type feedback
- High input impedance
- Long life, high stability
- Operates from 1 volt or lower input signal, or from transmitting slidewire
- Standard output of 2000 counts per minute at full scale input
- Linear calibration within ½ of 1% of scale
- Accuracy not affected by temperature changes or minor voltage changes
- Follows rapidly changing input accurately
- Complete floating system — requires no ground on either terminal

LECTROCOUNT II 231

THE LECTROCOUNT II

ELECTRONIC INTEGRATOR

offers unusual VERSATILITY and RELIABILITY

GENERAL DESCRIPTION

The ROYSON Lectrocount II is a completely electronic integrator, producing a continuous series of output pulses whose rate at any instant is proportional to the input signal. It is a chopper stabilized feedback device with very high input impedance, and combines the best in solid state and miniature tubes. It is designed to give long life and a high order of stability. Lectrocount II is capable of operating from input signals on the order of one volt, or from a transmitting slidewire. An optional panel meter indicates the value of the input variable.

INPUT

The standard input is zero to one volt DC or a slidewire position. No external power supply is required for the slidewire, as this is self-contained in the integrator. The slidewire should be nominally 1000 ohms, although modest variations in this value can be tolerated. Voltage inputs can be suppressed, such as 0.2 to 1.0 volt. In cases where the total input voltage span is 0.3 volt or less, we refer you to Lectrocount I, described in Bulletin 230. The input is full floating, so that either side can be grounded or can be operated several hundred volts from ground.

As an optional feature, an adjustment can be provided to shift the zero up or down scale approximately 12%. This adjustment does not affect the input range.

OUTPUT

The output is read on a self-contained counter mounted on the panel of the integrator. A switch on the back of the chassis permits changing the output to dry contact closures. In this way an external or remote counter can be used in place of the one on the panel. Where it is required to operate an electronic counter, Lectrocount II can be ordered for a pulse type output. The standard output rate is 2000 counts per minute at full scale input. However, this figure can be varied over a wide range to suit the application.

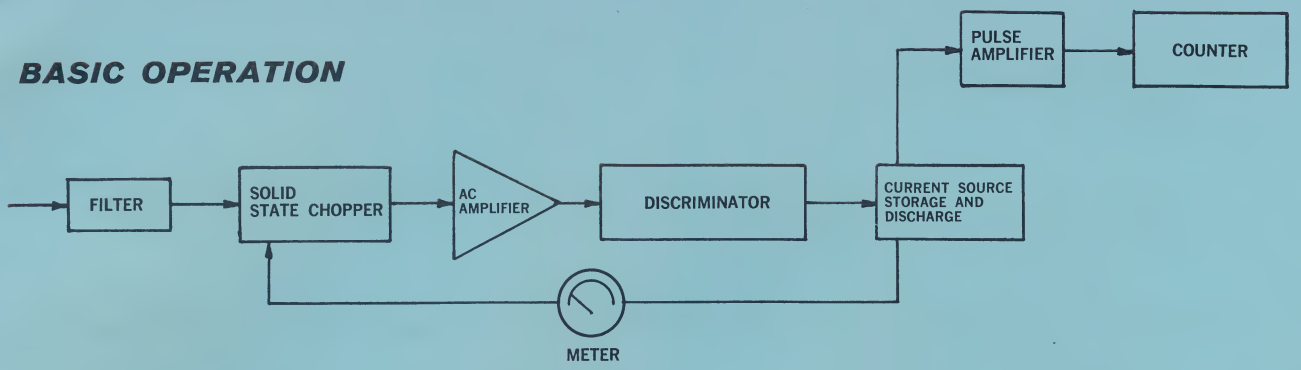
ACCURACY

The calibration is linear within ½ of 1 percent of full scale. The readings will repeat within ¼ of 1 percent of full scale at values above 5 percent of scale. The stability is such that many months of operation can be obtained without any adjustments being made. Temperature changes from zero to 125 degrees F and voltage changes of plus or minus ten percent will not introduce errors greater than ½ percent of full scale.

SPEED

A sudden step change in input of full scale will be followed accurately in 1/10 of a second. This means that a rapidly changing input can be followed accurately.

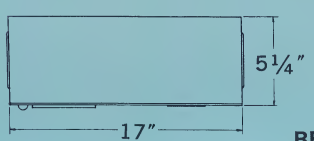
BASIC OPERATION



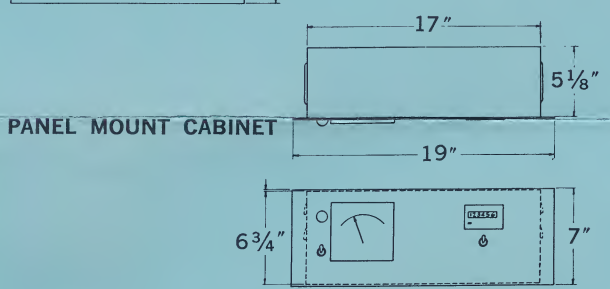
The difference between an input voltage and a feedback voltage is compared by a solid state chopper and the difference converted to a pulsating voltage. The AC component is amplified by a transistorized amplifier. The phase sense of this signal is recognized by a conventional phase detector which converts this signal into a high value DC voltage. This voltage controls the current of a pentode having a constant value screen potential. This output current passes into a storage capacitor and through a feedback resistor to reference. The capacitor charge is dissipated through a shorting means upon build-up to a critical value depending upon the flashing rate.

To accurately compensate for the inherent time constant of the capacitor and discharge device, the thyratron discharging circuit automatically advances its trigger point sufficiently with increasing input value to insure linearity. The high order of feedback insures practically perfect linearity between the input voltage and the feedback current, while the compensations insure linearity between flashing rate and the current flow. The overall system is linear with impressed input as covered in the above specifications. Calibration is made by simply adjusting the value of the feedback resistor to achieve a pulse rate in accordance with the desired input value of the variable. No adjustment is required to set the zero. The system is completely floating and does not require the imposition of a ground on either terminal. However, it is permissible to ground either side or operate at a potential well above ground level.

Lectrocount II can be supplied with an indicating meter on the front panel. This meter repeats the input signal in terms of percentage of the input. As the meter is in the feedback circuit, it does not draw any additional current from the input. Since the input impedance is on the order of several megohms, a negligible amount of current is drawn by the input of the integrator.



BENCH TOP CABINET



PANEL MOUNT CABINET

APPLICATIONS

By providing a recorder with a retransmitting slidewire, the Lectrocount II can be used to totalize the magnitude of the variable against time where the recorder has a linear relationship with the variable. Because it integrates the area under the curve being recorded, it is ideally suited for CHROMATOGRAPHY and DENSITOMETRY. It can also be used as an ANALOG TO DIGITAL CONVERTER. By counting the output pulses for a constant length of time, the average value of the input will be shown on the counter. KILOWATT HOURS can be TOTALIZED by providing a DC voltage signal proportional to watts, or by operating from the retransmitting slidewire on a kilowatt recorder. AMPERE HOURS can be TOTALIZED by using a shunt to provide a low voltage proportional to amperes.

ORDERING INFORMATION

When ordering the Lectrocount II, please give the following specifications:

- Bench top or panel mount cabinet.
- If meter to indicate input is required.
- Output type
  - —pulses for electronic counter
  - —self-contained counter
  - —contact closures to terminals
  - —no self-contained counter
- Output rate
  - —standard is 2000 rpm at full scale. Specify if other rate is desired.
- Input
  - —voltage signal
  - —give the range
  - —slidewire input
- Adjustable zero suppression supplied only if specified.

PRICES

Standard model includes self-contained counter with switch to provide contact closures for external counter, no meter $485.00

Cabinet types, input range, and output rate do not affect price.

Extra for meter to indicate input $45.00

Deduct $40.00 if self-contained counter is not required. This is always the case with pulse type output.

Adjustable zero suppression adds $50.00

OTHER ROYSON INSTRUMENTS

LECTROCOUNT 1 *Electronic Integrator*

This model is generally similar to Lectrocount II, except that it has a tube type circuit, and can operate with input ranges down to 0 to 5 MV full scale. Ask for Bulletin 230.

PNEUMATIC INTEGRATOR

Converts 3 to 15 psi air pressure into contact closures whose rate is proportional to the input pressure. Output rates up to 500 counts per minute can be supplied.

PLANIMETER

Integrates strip chart records. Portable, simple to operate—can be supplied for linear or square root charts. Made for any chart width.

IDENTICHARTS...

eliminate chart watching and marking. Identicharts print serial numbers, code numbers or letters, date and time, or numerical count on strip charts — from a remote point, automatically and accurately.

PRINTERS AND MARKERS

For automated, remote control printing of numbers, date and time, and other data. Consult us on any special requirements you may have for printing or marking.

ROYSON
ENGINEERING COMPANY HATBORO, PA. • (215) OSBORNE 5-2800

ROYSON

Effective February 1, 1963
Subject to change
without notice
All prices are net 30 days,
F.O.B. Hatboro, Pennsylvania

QUANTITY DISCOUNTS ARE AS FOLLOWS:

1 to 3	0%
4 to 10	3%
11 or more	5%

Write Factory for 25 or more

PRICE LIST

IDENTICHARTS

COL. A *Complete kit, including Identichart, plastic cover, plastic window to replace glass window in recorder, and all parts necessary for installation.*

COL. B *Extra for extension cable, wired to Identichart, and terminating in terminal strip which can be mounted inside recorder case.*

COL. C *Extra for installation by Royson at Royson plant, including wiring to terminals in the recorder case.*

		A	B	C
Model Ri-1A	Single figure serial number printer	$102.50	$ 5.00	$12.00
Model Ri-1	Six figure serial number printer	183.00	5.00	12.00
Model Ri-2	Time and Date Stamp (Either AM-PM, or 2400 Type)	286.00	7.00	14.00
Model Ri-3A	Remote selector, single figure, up to 12 positions	285.00	12.00	20.00
Model Ri-3	Remote selector, single figure, 12 to 24 positions	295.00	15.00	23.00
Model Ri-3AD	Remote selector, two figures, up to 12 positions	335.00	18.00	26.00
Model Ri-3D	Remote selector, two figures, 12 to 24 positions	365.00	24.00	32.00
Model Ri-3AT	Remote selector, three figures, up to 12 positions	395.00	33.00	40.00
Model Ri-3T	Remote selector, three figures, 12 to 24 positions	435.00	40.00	47.00
Model Ri-4	Printing Counter	255.00	7.00	14.00
Model Ri-5A	Combination Ri-2 and Ri-3A, up to 12 positions	445.00	15.00	23.00
Model Ri-5	Combination Ri-2 and Ri-3, 12 to 24 positions	460.00	18.00	25.00
	Combination of Models Ri-1 and Ri-2	400.00	9.00	15.00
	Combination of Models Ri-1 and Ri-3A	410.00	15.00	22.00

If the plastic cover and window are not required, subtract $12.00 from the above prices.

Type B Rectifier, will handle any one Identichart	$14.85
Type L Rectifier, will handle up to three Identicharts	26.50
Pulse shortening relay (for up to 50 operations per minute)	15.00
Pulse shortening relay (for more than 50 operations per minute)	28.50
Autoprint Relay—(Makes Ri-3A print automatically after any change in selector)	48.00

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PRICE LIST

INTEGRATORS AND ACCESSORIES

Bulletin 200 Integrator Kit, with linear cam, for field installation	$485.00
Extra for installation by Royson in Royson shop	35.00
Extra for non-linear cam	50.00
Single action pip pen	65.00
Dual action pip pen	95.00
Electric Counter, with manual reset	45.00
Bulletin 220 Pneumatic Integrator, with linear cam	615.00
Extra for non-linear cam	50.00
Extra for electric counter, mounted in integrator cabinet	45.00
Bulletin 230 Lectrocount, rack type mounting	845.00
Extra for desk top cabinet	30.00
Electronic counter for high speed Lectrocount	285.00
If Meter is not required, subtract	40.00
If Self-Contained Counter is not required, subtract	60.00
Bulletin 231—Lectrocount II—Rack Panel Mount or Bench Top Cabinet Standard Model with Self-Contained Counter, but no meter	485.00
Extra for meter to repeat input signal	45.00
If Counter is not required, subtract	40.00
Standard Model with pulse output to operate Electronic Counters, no Self-Contained Counter or meter	485.00

PLANIMETER

Bulletin 210 linear Planimeter for charts up to 4 inches	595.00
Bulletin 210 linear Planimeter for charts up to 6 inches	670.00
Bulletin 210 linear Planimeter for charts up to 12 inches	745.00
Extra for non-linear cam (all chart sizes)	50.00

CARD AND TAPE PRINTERS

Tape or card printing counter with electric reset	650.00
Time and Date in addition to counter	875.00
Remote 12 position code in addition to counter	845.00
Pressure sensitive tape for above printers (2¼ inch wide)	@ 70¢ in lots of 6 65¢ in lots of 12

QUICK CONTACT TIMERS

Bulletin 700 Quick Contact Timers (include Type B Rectifier)

Model A—fixed cycle, fixed pulse length	95.00
Model B—fixed cycle, adjustable pulse length	122.00
Model C—Adjustable cycle, fixed pulse length	135.00
Model D—Adjustable cycle, adjustable pulse length	160.00

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